DATA PROCESSING DIGEST

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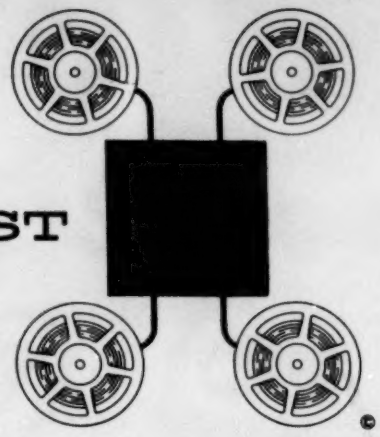

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Management Sciences

PREDICTION BY COMPUTER

J. K. Wyatt, Glacier Metal Co., Ltd. (England)
DATA PROCESSING, July-September 1959; pages 137-141.

The Glacier Metal Company set up a simulation to show the time it would take to produce particular batches of parts, the amount of work waiting at each machine, the utilization of labor and the totals of work in progress--all under various conditions of loading work on the machine shop and with different numbers of men and machines.

The model works in this way: "Each job is allocated to the appropriate machines in the correct sequence. There are more machines in the workshop than there are men to operate them. Jobs wait in a queue at each machine and are dealt with on a 'first-come, first-served' basis. When the job reaches the head of the queue further time elapses during which the machine is set up to perform the work; the parts are then processed.

"Every time a man completes the processing of a job on a particular machine, a priority rule determines whether he should start on the next job waiting in the queue or move to another machine. Two-shift working is incorporated; the machines which gain or lose men at each change of shift are decided by the priority rule."

Take a simplified example, a machine shop with six machines and three operators. "The obvious rule of allocating men to the machines with the longest queues would penalize those jobs going on lightly loaded machines. The solution adopted therefore is to set a criterion of priority for each job by assessing the difference between the scheduled completion time for the job on its current machine and the time it joined the queue for that machine.

"Whenever a job is completed on a machine the operator is sent to a central reserve. The computer then scans the jobs at the heads of the queues of the unmanned machines and allocates the man to the machine with the job possessing the highest priority on the basis just quoted. Of course, the machine the operator has just left has become inactive and, if it still has a queue of work, it will often reclaim him."

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A Ferranti Pegasus computer is used to perform the machine shop simulation, and can simulate 10 hours operation of the machine shop in one minute. Certain storage registers in the computer may be observed by means of a monitor tube during the actual run. It has been found instructive to watch fluctuations in the reserve of free men in this way. "As yet, no attempt has been made to decide the best sequence for feeding jobs into the machine shop. If this were the object of the exercise, a similar model would be set up and the jobs fed into the shop in various orders. It would not be possible to consider all permutations unless the number of jobs involved was very small."

General Information

BUPERS PROTECTS VITAL ADP RECORDS

NAVY MANAGEMENT REVIEW, September 1959; pages 8, 9.

"A major peacetime disaster in an electronic data processing center is a source of constant concern to Automatic Data Processing management personnel. The recent fire in the Pentagon has suggested that this concern is far from idle."

The Bureau of Naval Personnel Manpower Information Division has appointed a group to work out a plan for protection of records and continuity of operation in such an eventuality. The group's decision was that all master files, completed and partially completed programs, generalized routines, table tapes, and vital supporting documentation should be placed in the selected emergency stowage area.

Tape file protection plan

Each time a file is updated, the input data is moved to the emergency stowage replacing the previous material. For protection of completed programs, assembly listing tapes and copies of the assembly system tape were placed in stowage. For programs not yet accepted for production, the Head Programmers decide when the investment of programing manhours on a particular program is sufficient to justify the special safeguard precautions. For generalized routines, duplicate instruction tapes are placed in the emergency stowage. Each time a table tape is updated, a second copy is produced. Duplicates of other essentials, such as program listings and operators instructions are kept in the emergency stowage, also.

Keeping the emergency material up to date is a joint effort of programing and operating personnel. The Head Programmers determine what material should be there and when it should be changed. Operations personnel have physical custody of the tapes and are responsible for moving them. Each Head Programmer submits a daily report to the Operations Officer informing him of the tapes to be moved. Frequent audits of the tapes in the emergency stowage are made.

PENTAGON COMPUTERS IN ACTION 11 DAYS AFTER FIRE

OFFICE EXECUTIVE, September 1959; page 41.

The Pentagon fire started in an area which was fire resistant but not fire proof. Faulty wiring in a false ceiling--not related to the equipment--was the cause of the blaze. No irreplaceable documents were lost. Personnel records were replaced by duplicate tabulations within a week. Duplicates of destroyed programs were available elsewhere.

((The following information is from a news release issued August 3, 1959 by the General Services Administration. This agency has informed DPD that the official report on the fire is not available for general distribution upon advice of the Department of Justice.))

Temporary lights started the fire

The damaged area consisted of approximately 10,000 square feet on the first floor of the Pentagon building. The area in which the fire originated was a small addition to the storage room in the computing center which had been built to store additional tapes. The area was separated from the work room by a wood stud and plaster board partition. It was found that rearrangement of the metal shelving would further increase storage capacity, but to do this, the fluorescent light fixtures had to be removed and repositioned after the rearrangement of the shelves had taken place. Temporary lighting was installed. It is believed that the fire started as the result of one of the light bulbs becoming lodged between a metal shelf top and the fiber board acoustical ceiling material in the course of moving the racks and replacing the tapes in the racks.

Burning tapes produced dense, acrid smoke

The difficulty in fighting the fire and placing it under control was the direct result of the dense smoke and fumes resulting from the burning of the plastic tape reels and containers and the inaccessability of the area. The heavy black deposits found in adjacent areas after the fire was found to be directly attributable to the burning of this material. Tests conducted on this material indicated that it was readily susceptible to ignition, burned with considerable heat and developed an extremely acrid and dense black smoke. The smoke after traveling a short distance from the blaze, accumulated in stringy black masses which floated through the atmosphere.

Structural damage to the building was confined to the area directly above the storage room, which lends credence to the belief that the concentration of heat in this area, resulting from the burning of the tape reels and cases, was a major factor in feeding the fire and producing the fume and smoke condition in the general area which seriously handicapped the firemen fighting the fire and caused the relatively lengthy delay in getting the fire extinguished.

Estimates of damage to Government-owned property are: structural damage to Pentagon, $20,000; damage to computing center floors, walls, ceiling, and utilities, $170,000; Air Force equipment, mostly tapes, $500,000. This does not include cost of the leased IBM equipment destroyed.

HOW TO PLAN A HOME FOR A COMPUTER

Francis K. Green, Air Research Associates, New York
MANAGEMENT METHODS, October 1959; page 54-56, 100.

Computer systems engineers recommend four steps before a company assigns space for a computer: check the floor strength, determine air conditioning requirements, plan for electrical power, provide for expansion.

Some examples are given of difficulties companies get into because of inadequate planning or hasty selection of computer sites. For example, one company with an office on the 17th floor of a 30-story building installed its computer in the basement. A cooling tower had to be placed on the roof, necessitating heavy pipe condensers and other costly equipment, in addition to lines run 30 stories to the tower. Adequate air-conditioning equipment will prevent shut-down time resulting from overheating of the equipment. One hour of shut-down time, for instance, will buy and install a standby pump.

It is suggested that adequate room for expansion of the system be provided in the beginning. Expansion space can be used profitably in the interim, and is less costly than reinforcing floors, installing additional air conditioning, and encountering lost computer time because of remodeling disruptions.

((See DPD: "Cutting the Cost of Your EDP Installation" October 1958, page 6.))

DATA PROCESSING—PRESENT AND FUTURE

Felix Kaufman, Lybrand, Ross Bros. & Montgomery
AMERICAN BUSINESS, October 1959; pages 15-19.

Two problems confronting management are the increasing mountain of paperwork and the need for more reliable data. Advanced concepts of the use of EDP to overcome these problems are suggested in this article.

Basic to the processing of data by electronic means to answer management's problems is the transaction recording process. This must be classified into two areas: transactions that are internal to the data processing system; and transactions that are external, and which involve more than one data processing system.

Internal transactions can be the result of directed activity, and are, in fact, a part of the total management plan. This plan includes management's projections of future activity, and "one can foresee the day when the transaction device itself will have variance detecting skill," so that "no-variance" events will be reported, in effect, by their absence.

Furthermore, central data processing systems will be increasingly tied in with automation on the production line, so that the data collection process can be based upon the exception principle; and transaction recorders as we now know them will be merely intermediaries between machines and data processors.

In general, external transactions which must enter the data processing system have needed translation. For example, information produced by one company's computer must be translated into a medium (for example, punched cards) which may be read by the equipment of the company needing the information. Standardization of transaction media in this situation will depend upon voluntary cooperation of the parties involved. Clearinghouse techniques may develop, as well as practices such as a company placing its own transaction recording equipment in a customer's office.

THE INVENTORY CONCEPT OF ACCOUNTING

John S. Woodbridge, Pan American World Airways, Inc.
N.A.A. BULLETIN, October 1959; pages 5-12.

The full title of this article is "The Inventory Concept of Accounting as Expressed by Electronic Data Processing Machines and Applied to International Air Transportation."

The author views passenger accounting and payroll accounting as essentially inventory problems which can be handled in the inventory accounting manner. Pan American processes the complicated passenger accounting procedure by means of five tape files: opening inventory of tickets sold but not yet used, sales for the period, passenger lifts, billings by other airlines for their passenger lifts of sales made by this carrier, and refunds. Resulting tapes are: new inventory or unearned transportation revenue, matched lifts, matched refunds, charges to other airlines, and unmatched lifts and refunds. If the volume is not high, this fifth tape may be replaced by an electric typewriter connected to the central processor, and operating when its type of data turns up.

During short periods (a few milli-seconds) when the computer is not active on the passenger accounting problem, it can work on its payroll problem. ((The article does not make clear whether or not this is actually being done by the company.)) In addition, sales statistics are being prepared for the airline's cargo salesmen.

THE COMMUNICATIONS CHALLENGE TO INDUSTRY

F. Walton Wanner, Standard Oil Co. of New Jersey
From a Report to International Systems Meeting, October, 1959.

There is an urgent need for the development of a common business language and the adoption of standardized format for business documents by American business. Only in this way can data handling

machines and high speed computers be used economically. The Department of Defense has made some headway in beginning work on this problem ((see DPD, November 1959, page 11, "Common Language for Data Processing Systems")). The Air Transport Association has designed a uniform system of purchasing and controlling the delivery of airplane parts and supplies. The system is known as Specification 200, and includes standardized forms, documents, and codes. "A combination of systems of this type, accepted by all American business and industry, usable by the small business man as well as the large corporation, is necessary to keep America's productivity ahead of the nations of the slave world."

The Systems and Procedures Association Executive Committee has approved the start of a program to unify all the efforts of this kind now in existence.

THE SEARCH FOR PATTERNS AND RECOGNITION

AUTOMATIC DATA PROCESSING, October 1959; page 31-34.

A group at Manchester University in England has been working on the problem of computer pattern recognition, specifically, recognition of letters in whatever position or style they may be presented. The group has met with some success, using a method of scanning the letter, followed by computer analysis of the pattern to find certain features characteristic to specific letters. These features are obtained by breaking the letters into straight and curved segments, which are measured for shape, curvature and relative length. The results of the analysis are independent of the size and orientation of the symbol. The features relevant to each character are stored as a library in the computer. When an unknown letter is presented to the scanner, its features are analyzed as described above, and it is "recognized" as a member of the "library" with which it has the most features in common. If the unknown letter is distorted so that it is intermediate in properties between two members of the "library" the machine will state the probability of either letter having occurred. It is anticipated that this computer recognition method can be extended to deal with handwriting, in which case, the computer will have to make use of the context of each character as an aid to recognition.

Lincoln Laboratory of MIT is pursuing similar studies in pattern recognition in speech, a far more difficult problem than that presented by the written word.

NEW MACHINE "READS" HANDWRITING

Bell Telephone Laboratories have designed a small experimental device that reads ten handwritten words, "zero" through "nine" spelled out. The machine was invented to demonstrate methods which might eventually be applied in machines designed to read a wider variety of material.

To use the reader, the writer moves a metal stylus over a special surface just as if he were writing with a pen or pencil. Then, when he touches an "identify" button with the stylus, a light appears beside the numeral corresponding to the word he has written. The machine's logical design enables it to read entire words by picking out features of the over-all shape of the word. These include the length of the word, the dotting of "i's" and the number and position of vertically extended letters such as "h" and "g."

The handwriting reader requires that the writer write within limits on the special surface. The stylus, which is wired, makes electrical contact with 15 horizontal metal strips alternately sandwiched between strips of electrical insulating material in the surface. Up-and-down movements of the writing cause electrical connections to be made with the metal strips in sequence. The sequence and number of connections tell the word-reading device which of the ten words has been written.

Although the reader can recognize most individual styles of writing, it has some limitations. The writer must not print the words nor lift the stylus between letters, and he must dot his "i's." In tests of 1000 words written by 20 persons, the machine scored 97% accuracy. ((From a news release.))

SEARCHING AND UPDATING EASY WITH FILM-TAPE RECORDS

Peter James, IBM Corp., Yorktown Heights, N. Y.
CONTROL ENGINEERING, October 1959; page 129.

An experimental system is described in which graphic material, such as engineering drawings or documents may be carried on film, with a multi-track magnetic stripe running along the side. Updating of the information is by two methods: 1) reproduction on another film-tape, or 2) by updating in-line by which a reference code placed in the old data refers to new data placed at a random location on a "current file" tape.

MAGNETIC INK GOES TO WORK

MANAGEMENT AND BUSINESS AUTOMATION, September 1959; pages 14-19, 37-40.

The Merchandise National Bank of Chicago is located in the Merchandise Mart. Because of this location it has a daily activity far heavier than is normal for its size, and the operation is "costly to maintain at efficient levels of performance." The steps which lead to the installation of one of the first G.E. 210 MICR computers were the natural outcome of a study of new accounting methods and the need for heavy equipment replacement. The Head of the Planning and Research department, Glen R. Reiman, headed a two-year study of electronic equipment which resulted in purchase of the equipment in December 1958. To aid in considering the equip-

ment change, the bank figured the "replaceable" costs of each operation. "For example, a bookkeeper posting ledger transactions performs a number of separate steps to accomplish the posting. These include seeking the ledger, placing the ledger into the machine, picking up the balance and keying it into the machine, posting the transaction and placing the ledger back into the file. In our survey, each of these various steps was timed and assigned a cost value.

"Replaceable" costs were criteria for equipment change

"Thus, the replaceable costs would be the value of any of the steps eliminated by a new system. With reference to this same example, if one of the 'tronic' machines were adopted for the posting operation, the balance pickup would become automatic and eliminate this particular step from the operator's procedure. The cost of this step would be the replaceable cost to be used in evaluating the new equipment.

"Under a computer concept, the ledger posting would be eliminated, so the total cost of the operation would become the replaceable cost."

The "tronic" machines were ruled out early in the study. "We considered them as merely an improvement over our present bookkeeping equipment, and at best, only an intermediate step to a completely automated system. Our replaceable costs study indicated that 'tronics' would increase the cost over our existing system."

They rejected "crawl before you walk"

With the exception of the G.E. system, all of the proposed systems used punched cards as the input medium. "With the proposals came the cautioning 'crawl before you walk' philosophy, suggesting the use of cards as a 'safe' prelude to more advanced systems.... This obviously meant that our customers would first be asked to adjust to a punched card system and then later to still another method of operation. We rejected the 'crawl first' idea and concentrated all efforts on a magnetic ink system."

Employees were told about the bank's decision to automate. They were told that the new system would probably result in a reduction of about 36 people, all of whom would be either offered other positions at Merchandise or would be guaranteed a position at neighboring banks. A timetable for the changeover was given.

A three-week program of elementary instruction was offered, and 90 people responded. This was followed by an advanced class to which 15 people came. To these people was given a series of aptitude tests to find those who might be inclined toward programing techniques. Two members of this group were selected--a 20-year old man with a high school education, and a 19-year old girl, both of whom are now working on the programs.

Customers were informed of the change through a series of promotional letters, printed in magnetic ink, and signed by the president. Personal calls were made by bank officials on all of the large commercial checking accounts. The bank, along with G.E. is offering

help to customers' printers in the printing of the MICR checks, and the checks may be tested at the G. E. laboratories. The bank is producing checks on its premises with an Addressograph-Multigraph 1250 machine equipped with a newly-developed moistening head which provides an even spread and laydown of the magnetic ink.

NATIONAL CASH REGISTER BEGINS TESTING "E-13B" CHECKS

JOURNAL OF MACHINE ACCOUNTING, September 1959; pages 51-53.

A testing service is offered free of charge by The National Cash Register Company to banks, printers, and equipment companies that are imprinting checks in the new common machine language (MICR). The testing is a four-stage procedure:

1. A visual test is made of random checks using a printer's plastic gauge, to give a quick measure of the horizontal and vertical placement.
2. An optical comparator which magnifies 50 times is used to check individual magnetic characters for print dimensions, spacing, etc.
3. A signal level test and a readability test are made of random checks using a machine devised by NCR engineers.
4. A paper-handling test is made by automatically sorting the encoded checks on a Pitney-Bowes National Magnetic Character Sorter.

NCR suggests that 1200 encoded checks be submitted for the test. Write to Product Development, The National Cash Register Company, Dayton 9, Ohio, for further information.

FOOL-PROOF ALPHABETIC SEQUENCE NUMERIC CODING

AUDITGRAM, October 1959; pages 42-44.

VISI-record, Inc., manufacturer of visible record keeping systems has marketed VIStronic, a prepackaged solution to the account numbering problem faced by banks. The system consists of one million prelisted numbers, each complete with an electronically computed check digit for automatic machine verification of account selection. The numbers are arranged 128 to a sheet, and are kept in specially designed equipment, requiring just 8 square feet of floor space. The system may be expanded ten- or even 100-fold, if desired.

VIStronic has precalculated gaps between account numbers so that new accounts may be interspersed between existing accounts without loss of strict alphabetical sequence. Since an account is located in the same spot, whether lookup is by name or by number, no cross-reference files are required. The sheets are designed to

permit immediate location of numbers for new account assignment by sight. Space is also provided for noting kind of account, style of check, and date closed. A sample sheet from VIStronic illustrates the article.

A COMPUTER PAYS OFF AT FARMERS INSURANCE

MANAGEMENT AND BUSINESS AUTOMATION, October 1959; pages 13-16, 37.

Farmers Insurance Group has found that its IBM 705 computer installation has saved the company $140,755 in the first year's operation. In addition, the company has received earnings from selling second-shift time on the system. Present programs on the system include maintenance of the premium-in-force file, preparation and rating of premium notices, commission statements for agents, lists of premiums-levied for agents, accounting and statistical data for premiums written, losses, and payroll. A review of the planning period for the installation is included in the article. ((See DPD, April 1958, page 5 and December 1957, page 13 for articles about the planning stages of this installation.))

HARVARD ISSUES ELECTRONIC REPORT

AMERICAN GAS ASSOCIATION MONTHLY, October 1959; pages 22, 23, 32-35.

The Electronic Research Steering Committee of the American Gas Association and the Edison Electric Institute have pursued a five-year program of research into the methods and equipment for electronic processing of utility customer accounting. The research program was performed at Harvard University Computation Laboratory under the direction of Professor Howard Aiken.

Random access is recommended

The final report indicates that the complexity of the utility accounting problem is not readily adaptable to present computing systems, particularly those of the general purpose type. The need for interrogation to satisfy customer requests indicates that a random access system of some type is desirable. Two types of random access equipment are suggested, along with their respective advantages and disadvantages. These two types are the magnetic tape bin storage (in production) and the magnetic card storage (not commercially available at this time). It is suggested that time sharing of interrogation and data processing would speed up the comparatively slow operating speeds of random access systems. One difficulty in the proposed model is that it allows for only 50,000 accounts. Larger utilities would require a group of machines, or considerable redesign of the system to suit their needs. Exceptions are visualized as being handled manually, rather than by programed subroutines. It is believed that processing time saved in routine accounts would offset expense of special bookkeepers assigned to exceptional accounts.

Although the research of the past five years has resulted in the conclusion that there is not now available equipment adequate for utility accounting problems, this research has pointed out to equipment manufacturers the needs for specific characteristics. The A. G. A. -E. E. I. Electronic Accounting Machine Developments Committee is organizing to encourage design by manufacturers in the two fields in which they feel utilities need help--character sensing and random access storage.

ELECTRONICS CAN BE A GIRL'S BEST FRIEND

OFFICE MANAGEMENT, October 1959; pages 30, 31, 38.

The way in which two insurance companies prepared their employees for the changes wrought by an EDP system are described here. Mutual of Omaha and United of Omaha, two insurance firms operating from the same home office in Omaha, Nebraska, used the media of the house organ, Criss Cross Currents, the annual reports to the employees, special brochures, and extensive testing and retraining programs for employees to be displaced by the system. Detailed descriptions are given of the content of articles in the house organ which specifically referred to the coming of the computer, and of articles which had no apparent connection with the installation, but which sold, indirectly, the merits of retraining for new jobs. Apparent results of the program are the high morale and personal interest of all the personnel in the new system.

"If Mutual and United had not carefully planned and carried out an excellent transfer and re-training program for the employees whose jobs were affected, no amount of company 'propaganda' could have eased the impact of automation on employee morale.

"Conversely, the fact that the companies 'did right' by these employees would not have been, in itself, enough to alleviate employee fears in the many, many months before the changeover.

"But the companies realized that fears of automation are simply man's basic fear of the unknown. So, from the very first, all employees were kept informed of exactly what the companies were doing, why they were doing it, and what the ultimate effects would be."

HERE'S HOW TO TRAIN OFFICE WORKERS IN THE ELECTRONIC AGE

Robert L. Bell, Allied Publishers, Inc.
OFFICE EQUIPMENT & METHODS, October 1959; pages 27-30.

It is suggested that qualified and experienced employees who are to be retrained for the new profession of computer programers for an electronic computer system should have three courses: Introduction to Computers--a two-week course; Programing I--a six-weeks course; and Programing II--an advanced six-weeks course.

Business educators will need to re-assess their courses. For example, accuracy rather than speed will be the emphasis for typing training. Business course students should be trained to understand the basic concept of business, planning, production, cost control, packaging, marketing and distribution. Every school system should survey its local areas every five years and re-gear its teaching to the needs of the community. Schools have "an immediate obligation to acquaint students with data processing equipment, its nature and primary function, and its role in business today and tomorrow." Business educators are admonished to "recognize that they are business teachers first, and shorthand and typing and bookkeeping teachers second."

DISSERTATION ABSTRACTS

THE ACCOUNTING REVIEW, October 1959; pages 623, 632.

The Accounting Review abstracts theses submitted for graduate degrees which are of interest to the accounting profession. Two in this issue involve EDP. "The Commercial Applications of Electronic Data Processing Equipment," by Richard Fisher Peirce, University of Illinois, 1957, is a general description of the EDP field to that date, stressing applications in the business areas.

"A Survey of Electronic Data Processing and Its Potential Impact Upon Accounting Procedures, Personnel, and Education," by Robert Theodore Tussing, University of Texas, 1957, is a non-technical description of EDP equipment and applications. This thesis includes a section on the need for EDP courses in collegiate schools of business.

For information about these theses, write to the libraries of the respective universities.

THERE'S NO MYSTERY TO DESIGNING FORMS FOR AUTOMATIC SYSTEMS

Ray Marien, Olin Mathieson Chemical Corp.
THE OFFICE, October 1959; pages 130-132.

In designing forms for IDP, the designer must consider the mechanical limitations of the equipment, and he should "dry-run" trial forms and carbon dummies. Otherwise, the same principles hold true that apply to any good forms design.

NEW USERS GROUP

Users of the Burroughs 220 electronic data processing system have formed CUE, Cooperating Users' Exchange. President of CUE is Robert M. Gordon, Stanford University. For information, write to Burroughs ElectroData Division, Public Relations Department, 460 Sierra Madre Villa, Pasadena, California.

Applications

NOW COMPUTERS ARE DESIGNING POWER TRANSFORMERS

BUSINESS WEEK, October 17, 1959; pages 76-78, 83.

General Electric's Power Transformer Division is using its IBM 705 to design transformers, reducing total production time by 40%. What used to take three to four months of individual design, calculating, specification writing, and cost estimating, now is done in two to three days, during which the engineer prepares the specifications for IBM cards, and the computer produces the design, dimension sheet, bill of materials, and cost and inventory records.

GE programers had to find out the logic underlying the engineer's "intuitive" design decisions, then translated it into programs for the computer. Resulting transformer designs are standardized in three basic shapes without sacrificing a wide range of electrical characteristics, leading the way to automatic production line methods.

BUREAU OF NAVAL WEAPONS ACQUIRES AN RCA 501

The Navy's new Bureau of Naval Weapons, which replaces the Bureaus of Ordnance and Aeronautics, has installed an RCA 501 computer to provide world-wide, daily inventory, production and quality control for all Navy weapons, from the time they start through the production line until they are expended in training exercises or actual warefare. ((From a news release.))

APPLICATION OF ELECTRONICS TO TRUST ACCOUNTING

Leonard G. Getschel, Mercantile Safe Deposit and Trust Co., Baltimore
AUDITGRAM, October 1959; pages 24-30.

Mercantile Safe Deposit and Trust Company manages about 6500 accounts, using a card input IBM 650. Included in the operation are net income calculation, income tax advices, dividend and bond interest collections, common trust fund accounting and investment analysis.

SMALL "BRAINS" FOR THE SMALL COMPANY

DUN'S REVIEW AND MODERN INDUSTRY, September 1959; pages 92-98.

Economy Forms Corporation, Des Moines, Iowa, is a $5 million (sales) manufacturer of steel forms for use in concrete construction. The company is using an LGP-30 to prepare management reports from routine payroll and sales analysis paper tapes.

Programing

SHORTHAND FOR COMPUTERS

R. L. Martin, Remington Rand Company
JOURNAL OF MACHINE ACCOUNTING, October 1959; pages 47-56.

An introduction to automatic programing is presented, giving wide comparative coverage of Remington Rand systems, including Flexi-matic and Flow-matic. This will be of interest to those who are beginning their understanding of new automatic programing techniques. ((See also DPD, Vol. 5 (1959): April, pg 4; May, pg 16; July, pg 1; August, pg 15; November, pg 1.))

Equipment

SANDWICHES FOR A COMPUTER

Herbert F. Cherry, Minnesota Mutual Life Insurance Co.
BEST'S LIFE NEWS, October 1959; pages 67, 68.

The operators of Minnesota Mutual's Burroughs 205 computing system have found that a 3-M "Scotch" brand sandwich tape used in their Datafile bin and reel storage has solved 90% of their tape-read troubles. The tape has a protective coating of plastic over the oxide coating, saving the wearing of the oxide by the read heads which have previously necessitated cleaning of recording heads once-an-hour. The new tape has cut down this cleaning operation to once-a-day. The company has found that damage to the tape's thin plastic coating does not harm the recording surface itself. Moreover, the tape has shown no appreciable wear since its installation.

The company recently compared sandwich tape with "bare" (conventional) tape in a search/write, search/read test. A 30-inch portion of each tape was run past recording heads of a tape transport. The bare tape made its first error on its 1049th pass, while the sandwich tape continued for 12,030 passes before erring by picking up a bit.

COMPAGNIE DES MACHINES BULL CHECK READING SYSTEM

A news release describes an interesting character recognition system developed by the Bull Machines Company, which combines the advantages of direct reading and coded recording of

characters. The magnetic ink characters on a check processed by machines manufactured by this French company are located in the same general area as those in the ABA Specifications. However, the shape and reading process differ. The numerals are normal, rather squat, block style in shape. However, each number is composed of seven vertical lines of magnetic ink cut to form the figure, some lines in each character being thicker than others. The seven lines and six spaces form a unique pattern of thick and thin divisions for each of the 64 possible combinations. In numeral configurations, only combinations of four narrow spaces and two wide spaces are used. The system allows the code to be read at any horizontal series of points across the width of the numeral. A variation in the quality of printing in the numeral is therefore less likely to cause an error in reading. Information about the system may be obtained from Compagnie des Machines Bull, 94 Avenue Gambetta, Paris, France.

ROBOT BANK CLERKS

DATA PROCESSING, July-September 1959; pages 158-167.

The Bell Telephone Manufacturing Company of Antwerp, Belgium, has designed a data processing system which simulates manual clerical work by allowing the document or transaction paper to proceed, along with its own magnetic information, through the processing system.

Each document (or check, if a bank operation) is placed in a transparent plastic jacket that has, attached to the top edge, a stiffened flat strip that extends beyond the sides of the jacket. Also attached to the upper edge is a strip of magnetic tape one inch wide and about 7 3/4 inches long. All the revelant data to be processed are recorded on the magnetic tape. As the jackets are fed into the various machines they are transported mechanically to the operating positions by endless chains on which the protruding ends of the stiffened bar of the jacket rest. Information to be processed is read from the magnetic tape. The system is made up of four machines: the jacketing machine (with a keyboard for recording the document's information on the magnetic tape), the classifying machine (for sorting the documents into the desired order), the unjacketing machine, and the accounting posting unit.

THE RAPID SELECTOR

The National Bureau of Standards has developed an improved model of an automatic document retrieval device for the Patent Office and the Navy Bureau of Ships, which rapidly retrieves information from massive files of correspondence, drawings, patents, or similar printed matter which have been recorded on 35-mm microfilm. Associated with each document image is a binary dot code which identifies the content of the document. The machine examines these codes rapidly--about 2400 pages per minute--and when a desired document

is found, photographs it on a strip of recopy film. For more information, write to National Bureau of Standards, Office of Technical Information, Washington 25, D. C.

UNIVAC TAPE SEARCHWRITER

The Univac Tape Searchwriter is a method of searching a magnetic tape file for a desired item and then automatically typing the information, without consuming computer or programer time. It may also be used as an error-checking interrogator, because it incorporates all the error-checking features found in the Univac system. Any standard Univac characters can be entered from the keyboard or paper tape as the key or identifying data. As the key is entered, it is also printed on the typewriter. When the item is located, it is printed in standard Univac code. ((From a news release.))

IBM 357 DATA COLLECTION SYSTEM

A data transmitter similar in purpose to the Stromberg "Transacter" has been announced by IBM. The system provides reporting stations on the production line through which workers feed information, in the form of punched cards, about themselves (their employee number, pay rate, etc.) and the job (assembly and part number, operation, etc.) to a data center for processing. The stations can be as much as one cable-mile away from the center. At the center, an IBM card punch duplicates the transmitted information on a punch card, which may then be used as computer input for a variety of purposes. ((From a news release.))

BURROUGHS B 251 VISIBLE RECORD COMPUTER

Edith Harwith Goodman
COMPUTING NEWS, September 15, 1959; pages 11, 12.

BURROUGHS INTRODUCES NEW VISIBLE RECORD COMPUTER

UNITED STATES INVESTOR, September 19, 1959; pages 27-29.

The Burroughs B251 Visible Record Computer is a solid state machine designed for banking operations. It selects and writes directly on individual account records. It reads information from checks, deposit slips and other documents which are coded with the standard ABA magnetic ink characters. It processes the information and automatically computes, selects and posts directly to the correct customers' account record. These records are the standard ledger cards with magnetic strips on the back.

The system consists of four units: a sorter, a transistorized computer with magnetic core memory, a record processor, and the control console. Instructions may be given the system to reject checks on which stop payment orders have been placed, and to refuse payment of checks if an account is overdrawn. The system also balances transfers, computes and posts service charges, computes account profitability and accumulates trial balances, as each transaction is processed.

CORRECTION

In a digest of the STORES article "Account Numbering for EDP Systems," published on page 1 in the October 1959 DPD, it was erroneously stated that Woodward & Lothrop uses the ARANS SYSTEM. Actually, this is just one of the systems this store has investigated. Woodward & Lothrop has not yet made public any preference of account numbering systems.

Comment

STANDARDS IN EDP

In a field growing as rapidly as EDP, one cannot expect firm standards. It is impossible to standardize developments which do not yet exist! Nevertheless, among EDP users, there is hope that some professional group will begin to establish standards to eliminate duplication, added training and programing efforts, and the need for additional converters to make compatible units built to differing standards.

Listed below are some of the areas within the EDP field where standards appear to be needed along with comments on progress toward standardization.

Paper-Tape

One of the oldest of the media used in mechanized data-processing is punched (or marked) paper tape. The Teletype system and many "integrated" data gathering systems depend upon it, and many computers use it for auxiliary input and output. Since it is unlikely that paper tape techniques will change radically within the next 10 years (because of its inherent limitations and the fact that more effective media are available) standardization is both possible and useful. At the moment there are many variations[1] arising

Error-check digits are necessary in paper tape

largely from the fact that the natural standard--Teletype--uses a 5-level code, which does not permit error checking and therefore does not permit reliable data transmission.

The key factors which should be standardized are these:

1. Tape width: 7/8" to over 1" now in use.
2. Tape material and thickness.
3. Guide hole spacing (guide holes also serve as timing marks): now fairly well standardized at 10 per inch.
4. Hole sizes: fairly standard.
5. Number of levels: 5 to more than 8 in use. To permit effective data transmission at least 7-level, and probably 8, should be made standard. Eight would provide for both error checking and control signals.
6. Code: Standardizing the code has many implications in relation to other devices, and paper-tape code standards cannot be considered independently of computer and other standards.

Magnetic Tape

Magnetic tape forms and devices are not standardized in any respect. This is a natural result of the current rate of development. This rate is slowing down as we push the technical limits, and thoughts of standardization are in order. The key factors are these:

1. Tape width: 1/2" to 3" in use.
2. Tape material and thickness: Mylar of about 1 mil. thickness is common.
3. Form of electromagnetic recording.[2]
4. Number of channels: 7 to 32 in use. Probably eight channels, with possible use of multiples of eight, would form a basis for a standard.
5. Channel width.
6. Code: same problem as with paper tape.

Basic Code Representation

Standard code methods

As noted above, the method of coding alpha-numeric data needs standardization. Probably any reasonable code would be acceptable (e.g. binary-coded decimal with zone codes for alphabetic) providing it meets two criteria:

1. It contains error detection features (parity).
2. It permits a binary sort to give directly a normal alphanumeric sequence (e.g., 0, 1....9, A...Z, etc.).

This standard could be established now for gradual adoption without hampering technical developments.

Problem-Oriented Languages

First efforts are underway

Before standardization can be attempted in this area, there must be full understanding of what features a problem-oriented language[3] should have to be generally useful. The Department of Defense is making an effort to establish a standard language for its use,[4] which will have the effect of creating a national standard. Even this group admits the difficulty of creating a "standard" in that it plans an "immediate," an "intermediate," and finally a long-range standard. One valuable effort would be a good comparison of existing language proposals.

Computer Command Lists

The effort to standardize command lists depends to some extent on success in standardizing the problem-oriented language. Differences in command structure are often a manufacturer's sales point and therefore there is reluctance to standardize (even for two models built by the same company!). Nevertheless, suitable standards appear to be possible and would be a real reprograming cost-saver for those who obtain a new model from time to time.

Flow chart, run chart, and other symbols

These arbitrary symbols should certainly be standardized by an appropriate professional organization.

REFERENCES

1. H. L. Tholstrup, "Perforated Storage Media." Electrical Manufacturing, December 1958; page 53.
2. Grabbe, et al, "Handbook of Automation and Control," Vol. 2, pages 20-35 through 20-45. Wiley, New York, 1959.
3. "Significant Advances in Automatic Programing," Data Processing Digest, August 1959; page 15.
4. "Common Language for Data Processing Systems," Data Processing Digest, November 1959; page 11.

Meetings

Sixth National Symposium of Reliability and Quality Control
Date: January 11-13, 1960
Place: Statler Hilton Hotel, Washington, D. C.

66th Annual American Mathematical Society Meeting
Date: January 27-29, 1960
Place: Conrad-Hilton Hotel, Chicago, Illinois

Industrial Engineering Institute
Date: February 5, 6, 1960
Place: University of California (simultaneous sessions at Berkeley and Los Angeles)
Fee: $30.00
Information: Department of Conferences, University Extension, University of California, Berkeley 4, or Los Angeles 24, California

SHARE XIV Meeting
Date: February 15-19, 1960
Place: Statler Hilton Hotel, Los Angeles, California

Univac Users Association
Date: February 25, 26, 1960
Place: White Sulphur Springs, W. Va. (Greenbrier Hotel)

AMA Sixth Annual Data Processing Conference
Date: February 29 - March 2, 1960
Place: New York City (Statler-Hilton Hotel)
Information: American Management Association, Inc., 1515 Broadway, Times Square, New York 36, New York

IRE National Convention
Date: March 21-24, 1960
Place: Coliseum and Waldorf Astoria Hotel, New York, New York

Western Joint Computer Conference
Date: May 2-6, 1960
Place: San Francisco, California

Conference on Automatic Computing and Data Processing in Australia, sponsored by the Australian National Committee on Computation and Automatic Control
Date: May 24-27, 1960
Place: University of Sydney and University of New South Wales
Information: C. H. D. Harper, Secretary, Australian National Committee on Computation and Automatic Control, c/o The Institution of Engineers, Science House, 157 Gloucester Street, Sydney, Australia

National ACM Conference
Date: August 23-25, 1960
Place: Marquette University, Milwaukee, Wisconsin

Training

Operations Research Two-Week Course, sponsored by Case Institute of Technology

Date: January 18-29, 1960
Place: Case Institute of Technology, Cleveland, Ohio
Fee: $400
Information: W. W. Abendroth, Program Director, Operations Research Group, Case Institute of Technology, 10900 Euclid Avenue, Cleveland 6, Ohio

1960 Engineering and Management Course

Date: January 25 to February 4, 1960
Place: University of California at Los Angeles
Fee: $400
Content: Principles and techniques of a systematic approach to management, and the quantitative methods which supply the facts for this approach.
Information: Reno R. Cole, College of Engineering, University of California, Los Angeles 24, California

Engineering Executive Program

Date: September 1960 (Deadline for applications, March 1, 1960)
Place: University of California at Los Angeles
Program: Master's Degree program for engineers who will fill top executive positions in industry. The program will stress the evaluation function and the decision making function of the executive.
Fee: $350.00 for each semester
Information: Engineering, Room 4073C Engineering Building, Unit I; University of California, Los Angeles 24, California

Michigan State University offers graduate and undergraduate courses related to management sciences and electronic data processing: AFA405* Accounting Systems; Econ 516, General Equilibrium Economics (STATICS); Econ 575, Mathematical Programing; EE514, Automata and Abstract Computers; EE551, 2, 3, Switching Circuits and Logical Design; Math 451* Computer Coding; Math 458, 460* Numerical Analysis; MTA 425, 506c* Physical Distribution; MTA 503c, Seminar in Transportation; PPA 517, Management Programing and Control. *Undergraduate and graduate courses, others graduate only. The above current for the 1969-60 school year. For information write to Michigan State University, East Lansing, Michigan.

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References

DATA PROCESSING DIGEST does not provide copies of the original material digested or reviewed in this issue. The publishers addresses are listed below for your convenience in writing to them for more complete information.

Accounting Review
College of Commerce &
Business Administration
Ohio State University
Columbus, Ohio

American Business
4660 Ravenswood Ave.
Chicago 40, Illinois

American Gas Association Monthly
420 Lexington Avenue
New York 17, New York

Auditgram
38 South Dearborn St.
Chicago 3, Illinois

Automatic Data Processing
Mercury House
109-119 Waterloo Rd.
London SE 1, England

Best's Life News
75 Fulton Street
New York 38, New York

Business Week
330 West 42nd St.
New York 36, New York

Computing News
Box 261
Thousand Oaks, California

Control Engineering
440 West 42nd St.
New York 36, New York

Data Processing
Dorset House
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London SE 1, England

Dun's Review & Modern Industry
99 Church St.
New York 8, New York

Journal of Machine Accounting
208 South Main St.
Paris, Illinois

Management & Business Automation
600 West Jackson Blvd.
Chicago 6, Illinois

Management Methods
22 West Putnam Ave.
Greenwich, Connecticut

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505 Park Avenue
New York 22, New York

Navy Management Review
Supt. of Documents
U. S. Gov't Printing Office
Washington 25, D. C.

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